# Scientific Areas of Integrated Review Groups (IRGs)

For a listing of the Scientific Review Administrator and membership roster for each study section, click on the study section roster under the study section name within an IRG listed below or go to the study section index (study sections listed alphabetically) and click on the specified roster next to the name of the study section.

Molecular, Cellular, and Developmental Neuroscience IRG [MDCN]

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- Synapses, Cytoskeleton and Trafficking Study Section [SYN]
- Neural Degenerative Disorders and Glial Biology Study Section [NDGB]
- Neural Oxidative Metabolism and Death Study Section [NOMD]
- Biophysics of Neural Systems Study Section [BPNS]
- Neurotransporters, Receptors, Channels and Calcium Signaling Study Section [NTRC]
- Molecular Neuropharmacology and Signaling Study Section [MNPS]
- Neurogenesis and Cell Fate Study Section [NCF]
- Neurodifferentiation, Plasticity, and Regeneration Study Section [NDPR]
- Molecular, Cellular and Developmental Neuroscience Small Business Activities [SBIR/STTR] Special Emphasis Panel [MDCN Small Business SEP]
- Biochemical and Molecular Neuroscience Fellowship Study Section [F03A]
- Biophysical and Physiological Neuroscience Fellowship Study Section [F03B]

TOP

## Synapses, Cytoskeleton and Trafficking Study Section [SYN]

***Formerly MDCN-1***

[SYN Roster]

The Synapses, Cytoskeleton and Trafficking [SYN] Study Section reviews applications on the basic cell biology of nerve, muscle and other excitable cells, including synaptic plasticity, protein and organelle trafficking, cell surface and extracellular matrix molecules in cell recognition and function, and cytoskeletal functions across the life span. Emphasis is on fundamental mechanisms of excitable cell function, including those relevant to disease processes.

**Specific areas covered by SYN:**

- Formation, regulation, maintenance, and dynamics of synaptic structure and function in the central and peripheral nervous systems
- Molecular neuronal mechanisms of endocytosis, exocytosis and membrane recycling; protein assembly, folding and targeting; organelle, protein, and mRNA localization and trafficking
- Structure, function, modification, assembly and regulation of cytoskeletal proteins and molecular motors; axonal and dendritic transport; neuronal polarity, growth cones, and structural plasticity; cytoskeletal pathology; the proteosome/ubiquitin system
- Regulation of extracellular space; cell surface, extracellular matrix, and transmembrane components, and their function; cell recognition

**SYN has the following shared interests within the MDCN IRG:**

- **With Neural Degenerative Disorders and Glial Biology [NDBG]:** NDGB and SYN share interests with respect to cytoskeletal pathology as related to neurodegenerative diseases. NDGB may be appropriate if the emphasis is on the neurodegenerative aspects; but SYN may be appropriate if the focus is more on cytoskeletal and/or trafficking issues. (2) NDGB and SYN also share an interest in the area of proteolytic processing and the proteosome/ubiquitin system. Studies that focus primarily on the role of these processes in neurodegeneration may be appropriate for NDGB; studies that focus primarily on the role of these processes in synaptic plasticity or trafficking may be appropriate for SYN.
- **With Biophysics of Neural Systems [BPNS]:** BPNS and SYN share an interest in the area of synaptic function. Studies focused on the structure and function of signal transduction molecules may be appropriate for BPNS; more general studies of synaptic function may be appropriate for SYN.
- **With Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC]:** NTRC and SYN share interests with respect to synaptic function and the cellular regulation of signal transducer molecules. NTRC may be appropriate if the focus is on signal transduction pathways and electrophysiology; SYN may be appropriate for studies related to fundamental cellular, biochemical and molecular mechanisms of neuronal cell function.
- **With Molecular Neuropharmacology and Signaling [MNPS]:** MNPS and SYN share an interest in the area of synaptic dynamics. MNPS may be appropriate for studies focusing on neurotransmitter release, regulation and function; SYN may be appropriate for studiesof exocytosis, endocytosis, cellular trafficking and cytoskeletal interactions.
- **With Neurodifferentiation, Plasticity, and Regeneration [NDPR]:** NDPR and SYN share interests in (1) the area of neuroplasticity. Studies focused on developmental and regenerative events, including process outgrowth and guidance, dendritic development, and synaptogenesis, may be appropriate for NDPR. Studies focused on fundamental mechanisms of trafficking, basic cytoskeletal interactions, and synaptic function, including vesicular release, endocytosis, and receptor turnover may be appropriate for SYN. (2) NDPR and SYN share interests in the study of cytoskeletal, cell membrane and extracellular matrix components. Those studies that focus on developmental events or repair mechanisms may be appropriate for NDPR, while studies that focus on issues of trafficking or basic synaptic function may be appropriate for SYN.

**SYN has the following shared interests outside the MDCN IRG:**

- **With the Cell Biology [CB] IRG:** 1) The study sections of the CB IRG and SYN share an interest in general aspects of cell biology. Studies that address molecules and basic cellular processes may be appropriate for CB. Studies that address molecules and processes characteristic of the nervous system may be appropriate for SYN. (2) An additional area of shared interest is in vision research. Studies involving the visual system that require specialized knowledge or appreciation of the retina and posterior portion of the eye may be appropriate for CB. Studies involving the visual system that focus on fundamental aspects of trafficking, cytoskeletal interactions and cell surface or extracellular matrix molecules may be appropriate for SYN.
- **With the Genes, Genomes and Genetics [GGG] IRG:** The GGG IRG and SYN share interests in neurogenetic studies. Where the primary focus is on genetic mechanisms, emerging genetic techniques, or studies of genomic screening, linkage analysis, and molecular genetic regulation, the GGG IRG may be appropriate. Where the primary focus is on neural mechanisms, neural outcomes or neural diseases involving specific cytoskeletal or trafficking components (e.g., Fragile-X syndrome), SYN may be appropriate.
- **With the Musculoskeletal, Oral and Skin Sciences [MOSS] IRG:** The MOSS IRG and SYN share an interest in skeletal muscle. MOSS may be appropriate for studies of clinical aspects of skeletal muscle, skeletal muscle development and/or skeletal muscle force production; SYN may be appropriate when the primary focus in on neural structure and function, or the neuronal control of muscle force production.
- **With the Respiratory Sciences [RES] IRG:** The RES IRG and SYN have broadly shared interests in the areas of (1) neurotransmitters and (2) neural plasticity. Studies of neurotransmitters, when in the context of understanding the central control of breathing, may be appropriate for RES, while studies focused on the broader understanding of neurotransmitter function may be appropriate for SYN. Studies of respiratory neural plasticity, when in the context of response to hypoxia, may be appropriate for RES, while studies on broader aspects of neural

plasticity may be appropriate for SYN.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** The IFCN IRG and SYN share interests in cellular interactions involving cell surface and extracellular matrix molecules. Studies of such cellular interactions in the context of integrated circuits, systems, and behavior may be appropriate for IFCN. Studies of cellular interactions in the context of single cells may be appropriate for SYN.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) The study sections of the BDCN IRG and SYN share interest in the fundamental mechanisms of excitable cell function relevant to disease processes in the nervous system. Applications focused primarily on the disease or disease processes may be appropriate for the BDCN IRG. Studies that focus primarily on the basic underlying cellular or molecular mechanisms may be appropriate for SYN. (2) An additional area of shared interest is vision research. Studies involving the visual system that require specialized knowledge or appreciation of the anterior portion of the eye may be appropriate for the BDCN IRG. Studies involving the visual system that focus on fundamental aspects of trafficking, cytoskeletal interactions and cell surface or extracellular matrix molecules may be appropriate for SYN.xml:namespace prefix = "o" ns = "urn:schemas-microsoft-com:office:office" />

TOP

## Neural Degenerative Disorders and Glial Biology Study Section [NDGB]

[NDGB Roster]

The NDGB Study Section reviews applications on neurodegenerative disorders; neurodegeneration and programmed cell death; mapping novel transcripts and functional analysis of cloned gene products involved in cell survival or death; glial-neuronal interactions [Schwann cells, oligodendrocytes, astrocytes, and microglia]; mechanisms of glial differentiation, metabolism, and myelination; and neuroimmune function across the life span. Also considered are the roles of genetic factors, trophic molecules and extrinsic influences [including toxins, hormones, and addictive substances] in these processes, as well as molecular aspects of disease, injury, repair and interventional strategies.

**Specific areas covered by NDGB:**

- Characterization of abnormal protein processing associated with neurodegenerative disorders; structure-function studies of abnormal protein folding and/or aggregation and the clearance of aggregated proteins in the context of neurodegenerative disorders such as transmissible spongiform encephalopathies (prion diseases), Alzheimer□s Disease, Parkinson□s Disease, and Amyotrophic lateral sclerosis; delineation of physiological effects of aggregated proteins on neuronal or glial cell function; amyloidosis in the nervous system.xml:namespace prefix = "o" ns = "urn:schemas-microsoft-com:office:office" />

- Characterization of molecular mechanisms underlying neuropathology associated with 1) triple repeat neurodegenerative disorders such as Huntington□s disease or Friedreich ataxia, and 2) metabolic disorders such as the lysosomal storage disorders.

- Studies aimed at elucidating underlying pathological mechanisms that may lead to the development of neuroprotective strategies for treating degenerative disorders of the nervous system;

- Mapping novel transcripts and functional analysis of cloned gene products involved in neurodegeneration or neuroprotection, including characterization of apolipoprotein E (ApoE) and its role in neuropathological processes.

- Mechanisms in cell death due to aging, injury and environmental or genetic factors. This could include excitotoxins, free radicals, and neurodegenerative disease genes, as well as elucidation of excitotoxic, necrotic, and apoptotic mechanisms; and studies of mechanisms relevant to the development of neuroprotective strategies, such as the administration of exogenous growth factors.
- Basic biology of glial cells (oligodendrocytes, astrocytes, Schwann Cells, microglia), neuroglial interactions, and myelination in the adult; growth factors and receptors involved in neuroglial function; synthesis, regulation and degradation of myelin; inductive signals for the initiation, maintenance, and degradation of myelin; remyelination processes.
- Glial response to injury or infection, and innate immune function of glial cells; inductive signals, phagocytosis [microglia], role of cross-reactivity of neuroimmune molecules and the immune response [e.g., cytokines, interleukins]; neuroinflammation in injury, repair processes, and/or neurodegenerative disease; secondary inflammation.

- Neuroimmune functions (and dysfunctions) across the life span; neuroimmune molecules [e.g., cytokines, interleukins] and their interactions with the nervous system

**NDGB has the following shared interests within the MDCN IRG:**

- **With Synapses, Cytoskeleton and Trafficking [SYN]:** SYN and NDGB share review responsibilities regarding protein processing and clearance in neural cells. If the emphasis is on abnormal protein processing and/or clearance of aggregated proteins associated with neurodegenerative disease, then NDGB may be appropriate. SYN and NDGB also share review responsibilities regarding the repeat expansion diseases. If the emphasis is on aspects of trafficking, then SYN may be appropriate for review. If the emphasis is on aspects of the neurodegenerative disease, then NDGB may be appropriate.

- **With Neural Oxidative Metabolism and Death [NOMD]:** NOMD and NDGB share review responsibilities regarding mechanisms of neurodegeneration and neuroprotection. If the emphasis is on apoptotic mechanisms and cell survival, then NOMD may be appropriate for review. If the emphasis is on neurodegenerative disease mechanisms and neuroprotective strategies, then NDGB may be appropriate for review.

- **With Biophysics of Neural Systems [BPNS]:** NDGB has shared interests with BPNS in the area of protein aggregation and folding as relates to neurodegenerative disorders and/or synaptic function. NDGB may be appropriate for studies focused on basic mechanisms underlying neurodegenerative disorders; BPNS may be appropriate for studies focused on molecules, structures, and biophysics.

- **With Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC]:** NTRC and NDGB have shared interests in the area of general glial electrophysiology. NDGB may be appropriate for studies focused on specific electrophysiological properties related to basic glial biology, while NTRC may be appropriate for studies focused on genral electrophysiological properties of glia.

- **With Neurogenesis and Cell Fate [NCF]:** NCF and NDGB both review studies of cell death. Studies that focus on the involvement of cell death in lineage restriction or patterning in the developing nervous system may be appropriate for NCF. Studies of mechanisms of cell death per se may be appropriate for NDGB. Studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development may be appropriate for NDGB when the principal focus is on the role of these molecules in neuroprotection. NCF and NDGB also have shared interest in glial cells, particularly Schwann cells and oligodendrocytes. Studies of myelin proteins and mechanisms of myelination may be appropriate for NDGB. Studies that focus on molecular and genetic mechanisms of glial cell differentiation in the developing nervous system may be appropriate for NCF.

- **With Neurodifferentiation, Plasticity, and Regeneration [NDPR]:** NDPR and NDGB share review responsibilities regarding glial cell biology and regeneration following injury. Studies that focus on the role of glia in axon outgrowth, synapse formation, and morphological development of neurons may be appropriate for NDPR. Studies that focus on glial cell biology, myelination, and response to injury may be appropriate for NDGB. In the field of regeneration, studies focused on re-growth of axons or re-formation of synapses may be appropriate for NDPR while studies concerned with survival following injury and mechanisms of neurodegeneration may be appropriate for NDGB.

**NDGB has the following shared interests outside the MDCN IRG:**

- **With the Genes, Genomes and Genetics [GGG] IRG:** If the focus of the application is on genetics with the nervous system as a model, the application may be reviewed by the GGG IRG. Studies of genomic screening, linkage analysis, and molecular genetic regulation may be reviewed in GGG unless the primary focus is on neural mechanisms or outcomes.

- **With the Biology of Development and Aging [BDA] and Cell Biology [CB] IRGs:** NDGB has shared interests with the BDA and CB IRGs in the area of cell death. NDGB may review applications that focus on neurons and glia, while the BDA and CB IRGs may review applications in the broader context of cell death.

- **With the Biology of Development and Aging [BDA] IRG:** NDGB has shared interests with the BDA IRG in the areas of cell cycle, aging, hormonal action and degeneration of cells. If the focus of the application is on re-entry into the cell cycle as a neuropathological event, on the cellular or molecular mechanisms in the nervous system, or on neurodegeneration or neuroprotection, the application may be reviewed by NDGB; if the focus of the application is on other body systems, then the application may be reviewed by the BDA IRG.

- **With the Immunology [IMM] IRG:** NDGB has shared interests with the IMM IRG in the area of immune function. NDGB may be appropriate when the emphasis is on neuroimmune interactions.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications utilizing the visual system, but that focus on fundamental aspects of neurodegeneration, oxidative metabolism, or excitotoxicity may be reviewed in NDGB. Applications focused on the neurodegenerative aspects especially characteristic of the anterior portion of the eye or the retina may be reviewed by BDCN IRG or CB IRG, respectively.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** NDGB has shared interests with the IFCN IRG regarding cellular interactions in integrated circuits, systems, and behavior, as follows: neuroendocrine and neuroimmune function; sensory systems; and motor function. If the focus is cellular or molecular, assignment may be to NDGB. If the focus is integrative, assignment may be to IFCN.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications utilizing the visual system, but that focus on fundamental aspects of neurodegeneration, oxidative metabolism, or excitotoxicity may be reviewed in NDGB. Applications focused on the neurodegenerative aspects especially characteristic of the anterior portion of the eye or the retina may be reviewed by BDCN IRG or CB IRG, respectively.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) Study sections of the BDCN IRG may be appropriate for studies on pathogenesis, injury, and neuroimmune function; however, applications may be assigned to NDGB if the primary focus is on basic cellular and molecular mechanisms. NDGB also has shared interests with the BDCN IRG in terms of initial mapping and cloning of human disease genes that affect the nervous system. If the context is disease, the application may be reviewed by the BDCN IRG. If the context is basic science, the application may be reviewed by NDGB. (2) The BDCN IRG also has shared interests in the analysis of cloned gene products involved in cell survival or cell death. If the context of such a neuroscience application is disease, then BDCN may be appropriate for review. If the context of such a neuroscience application is basic science, then NDGB may be appropriate for review.

TOP

## Neural Oxidative Metabolism and Death Study Section [NOMD]

[NOMD Roster]xml:namespace prefix = "o" ns = "urn:schemas-microsoft-com:office:office" />

The NOMD Study Section reviews applications on neurodegeneration involving programmed cell death, necrosis and excitoxicity; analysis of cloned gene products involved in cell survival or death; reactive oxygen species and oxidative stress associated with neural injury, mitochondrial biology of neurons and glia in healthy and diseased states across the life span. Also considered are the roles of genetic factors, trophic molecules and extrinsic influences [including toxins, hormones, and addictive substances] in these processes, as well as basic aspects of disease, injury, repair and interventional strategies.

**Specific areas covered by NOMD:**

- Regulation of cell death and cell survival; functions and mechanisms of action of signaling molecules [such as neurotrophic factors, growth factors, cytokines, glutamate] and electrical activity in regulating cell survival. Intracellular signaling pathways leading to apoptosis, necrosis and excitotoxicity, and their intersection with the signal transduction pathways of survival factors.

- Mechanisms of cell death due to aging, disease, injury and environmental or genetic factors. This could include excitotoxins, free radicals, and neurodegenerative disease genes, as well as elucidation of excitotoxic, necrotic, and apoptotic mechanisms.

- The initial mapping and cloning of human disease genes that affect neural cell death and the analysis of cloned gene products involved in cell survival or cell death.

- Studies of mechanisms relevant to the development of neuroprotective or cell survival strategies, such as the administration of exogenous growth factors.

- Oxidative stress; special metabolic and energy demands of neurons and glia; relevant aspects of mitochondrial function and localization; aspects of mitochondrial dysfunction in disease states.

- Molecular mechanisms underlying neural injury associated with ischemia, reperfusion injury, traumatic brain injury, hypoxia, hypoglycemia, and excitotoxicity.

**NOMD has the following shared interests within the MDCN IRG:**

- **With Neural Degenerative Disorders and Glial Biology [NDGB] and Neurogenesis and Cell Fate [NCF]:** NCF, NDGB and NOMD all review studies of cell death. Studies that focus on the involvement of cell death in lineage restriction or patterning in the developing nervous system are appropriate for NCF. Studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development may be appropriate for NDGB when the principal focus is on the role of these molecules in neuroprotection. Studies of mechanisms of cell death per se may be appropriate for review in NOMD.

- **With Neural Degenerative Disorders and Glial Biology [NDGB]:** NDGB and NOMD share review responsibilities regarding mechanisms of neurodegeneration and neuroprotection. If the emphasis is on neurodegenerative disease mechanisms and neuroprotective strategies, then NDGB may be appropriate for review. If the emphasis is on apoptotic mechanisms and cell survival, then NOMD may be appropriate for review.

- **With Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC]:** NTRC and NOMD share interests in the area of calcium signaling. NOMD may be appropriate for studies focused on mitochondrial calcium, while NTRC may be appropriate for more general studies of calcium signaling.

**NOMD has the following shared interests outside the MDCN IRG:**

- **With the Biology of Development and Aging [BDA] and Cell Biology [CB] IRGs:** NOMD has shared interests with the BDA and CB IRGs in the area of cell death. NOMD may review applications that focus on neurons and glia, while the BDA and CB IRGs may review applications that focus on a broader context of cell death.

- **With the Biology of Development and Aging [BDA] IRG:** NOMD has shared interests with the BDA IRG in the areas of cell cycle, aging and hormonal action. If the focus of the application is on re-entry into the cell cycle as a neuropathological event, on the cellular or molecular mechanisms in the nervous system, or on neuroprotection, the application may be reviewed by NOMD; if the focus of the application is on re-entry into the cell cycle as a pathological event, on the cellular or molecular mechanisms, or on protection in multi-organ systems, the application may be reviewed by the BDA IRG.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) NOMD has shared interest with study sections of the BDCN IRG in studies on pathogenesis and injury. If the primary focus is on the disease, the BDCN IRG may be appropriate for review. If the primary focus is on basic cellular and molecular mechanisms, NOMD may be appropriate for review. (2) The BDCN IRG also has shared interests in the initial mapping and cloning of human disease genes that affect neural cell death and the analysis of cloned gene products involved in cell survival or cell death. If the context of such a neuroscience application is disease, then BDCN may be appropriate for review. If the context of such a neuroscience application is basic science, then NOMD may be appropriate for review.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] and Cell Biology [CB] IRGs:** Applications utilizing the visual system, but that focus on fundamental aspects of neurodegeneration, oxidative metabolism, or excitotoxicity may be reviewed in NOMD. Applications focused on anterior eye or retinal aspects of neurodegeneration, oxidative metabolism, or excitotoxicity may be reviewed by the BDCN IRG or CB IRG, respectively.

TOP

[BPNS Roster]

The Biophysics of Neural Systems [BPNS] Study Section reviews applications on signal transduction in nerve, muscle, and other excitable cells, with the primary focus on the structure and function of the transducers themselves. This includes basic studies of subunit structure, molecular dynamics, gating and selectivity, and second-messenger cascades. This also includes basic biophysical studies of excitable membranes and their components, the biophysical integration of neural function, mathematical modeling, and computational studies. General approaches may include molecular and structural biology, pharmacology, biophysics, electrophysiology, protein chemistry, imaging and labeling techniques. Emphasis is on fundamental molecular mechanisms at the structural level, including those relevant to disease processes.

**Specific areas covered by BPNS:**

- Signal transduction molecules in neurons, glia, muscle, and excitable cells; sensory transducers; neuromodulators; voltage-gated and ligand-gated ion channels; gap junctions and connexins.
- Model systems; relevant in vivo, in vitro, tissue slice, and tissue culture studies; molecular function in transgenic cells, cell lines, oocytes, and other expression systems; artificial lipid bilayers.
- Structure and function relationships in neural proteins, nucleic acids, carbohydrates, and their complexes; structural biology, including tomographic, crystallographic, spectroscopic, and imaging studies; three dimensional structural analysis, including subunit multimerization, neural protein folding and misfolding, assembly and aggregation, protein dynamics and protein-ligand interactions; molecular modeling; constructs altered through molecular genetic and chemical means.
- Neural protein interactions; local physical interactions; regulation of function; kinetics; microdomains; biophysics of membrane interfaces.
- Biophysical integration of neural function; quantitative modeling of neural function, such as synaptic integration and spike encoding; mathematical modeling at the cellular and molecular level; theoretical and computational approaches to neural membranes and proteins.
- Voltage dependence, ligand-gating and ionic selectivity, including patch-clamp and whole cell electrophysiology studies; activation, inactivation, pharmacology, and related aspects of molecular regulation.
- Coupling to second messenger pathways, including G-proteins and other enzymatic effectors; cyclic nucleotides and lipid metabolites, and Ca2+; relevant enzyme pathways [kinases, phosphatases, phospholipases].

**BPNS has the following shared interests within the MDCN IRG:**

- **With Synapses, Cytoskeleton and Trafficking [SYN]:** BPNS has shared interests with SYN in the area of signal transduction, trafficking and cytoskeletal molecules. BPNS has particular expertise in the structure and function of signal transduction and cytoskeletal molecules, but SYN may be appropriate for more general studies of synaptic function.
- **With Neural Degenerative Disorders and Glial Biology [NDGB]:** BPNS has shared interests with NDGB in the area of protein aggregation and protein folding as it relates to neurodegenerative disorders and/or synaptic function. BPNS may be appropriate for molecular, structural, and biophysical studies, while NDGB may be appropriate for studies more focused on basic mechanisms underlying the neurodegenerative disorders.
- **With Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC]:** BPNS has shared interests with NTRC in the area of synaptic function, signal transduction and imaging. BPNS may be appropriate for molecular, structural, and biophysical studies, while NTRC may be appropriate for studies of cellular electrophysiology, synthesis and regulation of the transduction molecules, and most studies involving calcium pathways.
- **With Molecular Neuropharmacology and Signaling [MNPS]:** BPNS has shared interests with MNPS in the area of signal transduction, especially with respect to second messenger pathways. BPNS may be appropriate for molecular, structural, and biophysical studies, while MNPS may be appropriate for neurochemical and pharmacological studies.

**BPNS has the following shared interests outside the MDCN IRG:**

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** BPNS has shared interests with the BCMB IRG in the

study of model membranes; structure and function relationship of proteins, carbohydrates, nucleic acids; structural biology; quantitative modeling; theoretical and computational approaches, etc. BCMB IRG may review studies of model membranes, protein structure and function, and structural biology, theoretical and computational approaches, etc. when the focus is on biological chemistry or macromolecular biophysics. BPNS may review studies of the structure/function of cell membranes, channels, receptors, signal transduction molecules, etc. when the focus is on cells/molecules of the nervous system or other excitable cells.

- **With the Cell Biology [CB] IRG:** BPNS has shared interests with study sections of the CB IRG with respect to second messenger pathways and gap junctions, and applications involving excitable cells of the musculature and the visual system. (1) The CB IRG may review studies of kinase/phosphatase pathways and the regulation of cell growth; BPNS may review studies where signal transducers lead to changes in phosphorylation/dephosphorylation of proteins or other second-messenger functions in the nervous system. (2) The CB IRG may review research emphasizing the cell biology and biochemistry of gap junctions and connexins, while BPNS may review research emphasizing the electrophysiological and biophysical aspects of gap junctions or research emphasizing cells of the nervous system. (3) The CB IRG may review research on muscle structure and contractile proteins; BPNS may review research on biophysical studies of signal transduction of these excitable cells. (4) The CB IRG may review research on signal transduction molecules, or voltage-gated or ligand-gated ion channels when the focus is on aspects that are especially characteristic of the retina while BPNS may review vision-related studies dealing with signal transduction molecules, voltage-gated or ligand-gated ion channels when the focus is on the molecular, structural and biophysical aspects.

- **With the Cardiovascular Sciences [CVS] IRG:** BPNS has shared interests with study section of the CVS IRG with respect to cardiovascular applications. The CVS IRG may review clinical aspects of cardiac muscle, especially in the context of heart disease; BPNS may review biophysical studies of the signal transduction molecules or studies focused on the molecular, structural and biophysical aspects of these excitable cells.

- **With the Digestive Sciences [DIG] IRG:** BPNS has shared interests with study sections of the DIG IRG in the area of gut-specific signal transduction and neuroactive drugs. Studies focusing on gut-specific signal transduction may be assigned to the DIG IRG. Studies focusing on general neuronal signal transduction in a gut-specific setting may be assigned to BPNS. Also, applications on neuroactive drugs may be assigned to BPNS if the primary focus is on neurotransduction mechanisms.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** BPNS has shared interests with the IFCN IRG in the areas of signal transduction in the context of integrated circuits, systems and behavior, with particular expertise in neuronal basis of behavior; neuroendocrine and neuroimmune function; rhythms and oscillatory behavior; sensory function, and motor function; and long-term potentiation and depression. (1) IFCN may be appropriate for studies of transduction molecules at the integrated and system level. BPNS may be appropriate for studies of transduction molecules at the structural and cellular level, including second messenger pathways. (2) The IFCN IRG may be appropriate for studies of long term potentiation [LTP] and long term depression [LTD] in learning; BPNS may be appropriate for studies of the biophysics of ion channels in LTP/LTD.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) The IFCN IRG and BSCT share an interest in signal transduction. The IFCN IRG may be more appropriate for studies of transduction in the context of integrated circuits, systems, and behavior, including neuroendocrine and neuroimmune function; rhythms and oscillatory behavior, and sensory and motor function. BSCT may be more appropriate for studies of transduction at the molecular and cellular level, including second messenger pathways. (2) The IFCN IRG and BSCT share an interest in studies of long term potentiation [LTP] and long term depression [LTD]. The IFCN IRG may be more appropriate for studies of LTP and LTD in the context of learning, but BSCT may be more appropriate for studies of the biophysics of ion channels in LTP/LTD.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** BPNS has shared interests with study sections of the BDCN IRG with respect to research related to neurodegenerative disorders and injury and studies related to the molecular, structural and biophysical aspects of the visual system. (1) Study sections of the BDCN IRG may review in vivo and clinical research in neurological disorders and injury, but BPNS may review fundamental cellular and molecular mechanisms in signal transduction and biophysical studies in neurons and synapses. (2) The BDCN IRG may review applications focused on vision-related applications dealing with signal transduction molecules, voltage-gated or ligand-gated ion channels when the focus is on aspects especially characteristic of the anterior portion of the eye. BPNS may review vision-related studies dealing with signal transduction molecules, voltage-gated or ligand-gated ion channels when the focus is on the molecular, structural and biophysical aspects.

TOP

## Neurotransporters, Receptors, Channels and Calcium Signaling Study Section [NTRC]

***Formerly MDCN-4***

[NTRC Roster]

The Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC] Study Section reviews studies of signal transduction pathways in neurons, muscles, and other excitable cells with particular emphasis on cellular regulation and physiology. This includes studies of calcium physiology, regulation of ionic gradients, ion pumps and molecular transporters, ion channels, and synthesis and regulation of transduction molecules. Studies may integrate molecular, cellular, electrophysiological, and imaging approaches to examine molecular regulation, transduction,

biochemical changes, cellular physiology, and functional consequences. Emphasis is on fundamental cellular mechanisms, including those relevant to disease processes.

**Specific areas covered by NTRC:**

- Intracellular regulation of calcium; calcium channels, calcium storage, homeostasis, and buffering; calcium as a second messenger; electrophysiology; calcium imaging
- Ion pumps and molecular transporters; electrochemical coupling; maintenance of ionic gradients; membrane properties and electrodynamics; imaging studies
- Ion channels and neurotransmitter receptors; electrophysiological studies within the context of cellular physiology; interactions with second messenger systems; regulation and modulation of ion channels and receptors; ionotropic and metabotropic receptors
- Synthesis, insertion and regulation of transduction molecules; genetic regulation, transcription/translation, protein modification, localization, assembly, turnover, and degradation; local regulation of synaptic structure and function [i.e., insertion, accumulation, localization]
- Muscle cell electrophysiology and propagation of electrical signals

**NTRC has the following shared interests within the MDCN IRG:**

- **With Synapses, Cytoskeleton and Trafficking [SYN]:** SYN and NTRC share interests in the area of synaptic function and the cellular regulation of signal transducer molecules. If the focus is on fundamental cellular, biochemical and molecular mechanisms of neuronal cell function, the application may be appropriate for SYN. NTRC may be appropriate for studies focusing on electrophysiology and signal transduction pathways.
- **With Biophysics of Neural Systems [BPNS]:** BPNS and NTRC share interests in the area of signal transduction. NTRC may be appropriate for studies of cellular electrophysiology and the synthesis and regulation of the transduction molecules, and most studies involving calcium pathways, while BPNS may be appropriate for molecular, structural, and biophysical studies.
- **With Molecular Neuropharmacology and Signaling [MNPS]:** MNPS and NTRC have significant shared interests in the area of signal transduction, especially with respect to second-messenger pathways. NTRC may be appropriate for studies of cellular electrophysiology [especially involving calcium], while MNPS may be appropriate for neurochemical and pharmacological studies.
- **With Neurodifferentiation, Plasticity, and Regeneration [NDPR]:** NDPR and NTRC share an interest in the plasticity of synaptic connections. NDPR may be appropriate when the emphasis is predominantly on the cellular, biochemical and molecular aspects of synaptic plasticity, while NTRC may be appropriate when the emphasis is more on cellular electrophysiology [especially involving calcium].

**NTRC has the following shared interests outside the MDCN IRG:**

- **With the Cell Biology [CB] IRG:** 1) The CB IRG and NTRC share interests in contractile proteins and muscle research. The CB IRG may be appropriate for general cellular studies of muscle structure and contractile proteins; NTRC may be appropriate for electrophysiological studies of signal transduction. (2) The CB IRG also shares interests with NTRC in the area of vision research. Applications that require specialized knowledge or appreciation of the retina or the posterior portion of the eye may be appropriate for the CB IRG; applications that focus on fundamental aspects of molecular transporters, ion pumps, and cellular electrophysiology, particularly if they involve calcium, may be appropriate for NTRC.
- **With the Cardiovascular Sciences [CVS] IRG:** The CVS IRG and NTRC share interests in cardiac muscle. CVS may be appropriate for clinical aspects of cardiac muscle, especially in the context of heart disease, but NTRC may be appropriate for basic electrophysiological studies. CVS may also be appropriate for review of skeletal muscle excitation-coupling [E-C coupling].
- **With the Musculoskeletal, Oral and Skin Sciences [MOSS] IRG:** The MOSS IRG and NTRC share an interest in skeletal muscle. MOSS may be appropriate for studies of clinical aspects of skeletal muscle and/or skeletal muscle force production, but NTRC may be appropriate when the primary focus in on neural structure and function and/or neuronal control of muscle force production.
- **With the Digestive Sciences [DIG] IRG:** The DIG IRG and NTRC share an interest in gastro-intestinal signal transduction. Studies focusing on signal transduction and neuroendocrine peptides may be appropriate for DIG; however, studies focusing on neuroendocrine peptides or general neuronal signal transduction may be appropriate for NTRC.
- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) The IFCN IRG and NTRC share interests in signal transduction and transport in the areas of the neuronal basis of behavior; neuroendocrine and neuroimmune function; rhythms and oscillatory behavior; sensory function; and motor function. The IFCN IRG may be appropriate for such signal transduction and transport studies when the context is on integrated circuits, systems, and behavior. However, NTRC may be appropriate for studies of transport or transduction

molecules at the cellular electrophysiological level. (2) The IFCN IRG and NTRC also share interests in long-term potentiation [LTP] and long-term depression [LTD]. Applications involving LTP and LTD in learning may be assigned to the IFCN IRG, but applications involving the cellular and molecular basis of LTP/LTD may be assigned to NTRC, especially if they involve intracellular calcium signaling or physiology.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) The BDCN IRG shares interests with NTRC in neurological disorders. If a study involves research in neural disorders and injury, BDCN may be appropriate; however, if the study involves fundamental cellular mechanisms in signal transduction, NTRC may be appropriate. (2) BDCN also shares interests with NTRC in the area of vision research. Applications that require specialized knowledge or appreciation of the anterior portion of the eye may be appropriate for the BDCN IRG; while applications that focus on fundamental aspects of molecular transporters, ion pumps, and cellular electrophysiology, particularly if they involve calcium, may be appropriate for NTRC.

TOP

## Molecular Neuropharmacology and Signaling Study Section [MNPS]

***Formerly MDCN-5***

[MNPS Roster]

The Molecular Neuropharmacology and Signaling [MNPS] Study Section reviews projects on neuronal and muscle signal transduction and neurotransmitters with a particular focus on neurochemical and pharmacological mechanisms. This includes studies of ligand interactions, neuromodulator interactions, neurotransmitter metabolism, and the development of therapeutic compounds. Emphasis is on fundamental cellular mechanisms, including those relevant to disease processes.

**Specific areas covered by MNPS:**

- Pharmacological and neurochemical studies of ligand activation, G-protein coupling, and signal transduction cascades; studies of receptor agonists and antagonists; development of experimental and therapeutic approaches
- Neurotransmitter and neuromodulator pathways; enzyme function and regulation; regulatory mechanisms; metabolic plasticity within the cell; synaptic dynamics [release, diffusion, inactivation, re-uptake]
- Modulators of synaptic function, including growth factors, neurotrophins, neuropeptides, neurosteroids and neurotoxins; neurophysiology and neuropharmacology of modulatory mechanisms
- Ligand activation of second messenger pathways; pharmacological and neurochemical studies of ligand activation of G-proteins and other effectors

**MNPS has the following shared interests within the MDCN IRG:**

- **With Synapses, Cytoskeleton and Trafficking [SYN]:** SYN and MNPS share an interest in the area of synaptic dynamics. SYN may be appropriate for studies of exocytosis, endocytosis and cellular trafficking while MNPS may be appropriate for studies focusing on neurotransmitter release, regulation and function.
- **With Neural Degenerative Disorders and Glial Biology [NDGB] :** NDGB and MNPS share interests in the areas of energy and oxidative metabolism and excitotoxicity. NDGB may be appropriate for studies focused on the energy demands of neurons and glia, mitochondria function and dysfunction, and the role of oxidative stress in neurodegeneration or neuroprotection, while MNPS may be appropriate for studies focused on oxidative metabolism and excitotoxic agents.
- **With Biophysics of Neural Systems [BPNS]:** BPNS and MNPS have significant shared interest in the area of signal transduction, especially with respect to second messenger pathways. BPNS may be appropriate for molecular, structural, biochemical and biophysical studies, while MNPS may be appropriate for neurochemical and pharmacological studies of signal transduction.
- **With Neurotransporters, Receptors, Channels and Calcium Signaling [NTRC]:** NTRC and MNPS have significant shared interests in the area of signal transduction. NTRC may be appropriate for studies of cellular electrophysiology, the synthesis and regulation of transduction molecules, and most studies involving calcium pathways, while MNPS may be appropriate for the neurochemical and pharmacological aspects of signal transduction.

**MNPS has the following shared interests outside the MDCN IRG:**

- **With the Biological Chemistry and Macromolecular Biophysics [BCMB] IRG:** (1) The BCMB IRG and MNPS share interests in the area

of receptor agonist/antagonist studies. If the focus is chemical synthesis of these molecules, BCMB may be appropriate. If the focus is receptor activation/inactivation in neural systems, MNPS may be appropriate. (2) The BCMB IRG and MNPS also share interest in the area of molecular pharmacology and medicinal chemistry/drug design. If the focus is primarily on molecular pharmacological/pharmacokinetic or medicinal chemistry/drug design per se, the BCMB IRG may be appropriate. If the focus is on molecular pharmacology/pharmacokinetics or medicinal chemistry/drug design in the context of agents affecting neural systems, MNPS may be appropriate.

- **With the Cell Biology [CB] IRG:** 1) The CB IRG and MNPS share an interest in signal transduction and second messenger pathways. The CB IRG may be appropriate for studies of kinase/phosphatase pathways and the regulation of cell growth, while MNPS may be appropriate for studies of phosphorylation/dephosphorylation of brain-specific proteins or functions unique to the nervous system. (2) Another shared interest is in vision research. Applications that require specialized knowledge or appreciation of the posterior portion of the eye or the retina may be appropriate for the CB IRG, while applications that focus on neurochemical and pharmacological aspects of signal transduction may be appropriate for MNPS.

- **With the Cardiovascular Sciences [CVS] IRG:** The CVS IRG and MNPS share an interest in cardiac muscle. CVS may be appropriate for clinical research on cardiac muscle, especially in the context of heart disease. MNPS may be appropriate for neurochemical and pharmacological studies of signal transduction molecules in neuronal systems controlling the heart.

- **With the Endocrinology, Metabolism, Nutrition and Reproductive Sciences [EMNR] IRG:** The EMNR IRG and MNPS have broadly shared interests in the areas of neuropeptide/receptor interactions, second messengers and effectors, and neuropeptide processing enzymes. Studies of receptors for hypothalamic releasing or inhibiting factors or neuropeptide processing may be assigned to the EMNR IRG; studies of such receptors may be assigned to MNPS when the focus is on signaling that is specific to neurons/glia.

- **With the Digestive Sciences [DIG] IRG:** The DIG IRG and MNPS share interests in gastro-intestinal signal transduction. Studies on signal transduction by neuroendocrine peptides may be appropriate for the DIG IRG when the focus is on the actions or disposition of nutrients. Studies on such signal transduction may be appropriate for MNPS when the focus is on signaling that is specific to neurons/glia.

- **With the Respiratory Sciences [RES] IRG:** The RES IRG and MNPS have broadly shared interests in the areas of (1) neurotransmitters and (2) neural plasticity. Studies of neurotransmitters, when in the context of understanding the central control of breathing, may be appropriate for RES, while studies focused on the broader understanding of neurotransmitter function may be appropriate for MNPS. Studies of respiratory neural plasticity, when in the context of response to hypoxia, may be appropriate for RES, while studies on broader aspects of neural plasticity may be appropriate for MNPS.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) Study sections of the IFCN IRG and MNPS share interest in signal transduction. The IFCN IRG may be appropriate for signal transduction studies involving integrated circuits, systems, and behavior, while MNPS may be appropriate for studies involving transduction molecules and G-protein coupled receptors, with a particular emphasis on neurochemical and pharmacological approaches. (2) Another area of shared interest is in long-term potentiation [LTP] and long-term depression [LTD]. The IFCN IRG may be appropriate for applications involving LTP and LTD in learning, but MNPS may be appropriate for applications involving the pharmacological basis of LTP/LTD.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) The BDCN IRG and MNPS share interest in neurological disease processes. For studies focused on basic and clinical research in neural disorders and injury, BDCN may be appropriate. For studies focused on signal transduction, G-protein coupling, and other fundamental cellular and molecular mechanisms underlying the neural disorders or injuries, MNPS may be appropriate. (2) The BDCN IRG and MNPS also share interest in the area of vision research. Applications that require specialized knowledge or appreciation of the anterior portion of the eye may be appropriate for the BDCN IRG, while applications that focus on neurochemical and pharmacological aspects of signal transduction may be appropriate for MNPS.

TOP

## Neurogenesis and Cell Fate Study Section [NCF]

***Formerly MDCN-6***

[NCF Roster]

The Neurogenesis and Cell Fate [NCF] Study Section reviews applications concerned with the initial formation of cells in the developing nervous system, as well as cell specification, determination, and differentiation. Areas to be included are: regulation of the cell cycle; induction of neural tissue; brain region specification and patterning; stem cell and progenitor cell proliferation, migration, and phenotypic determination; development and regulation of circadian rhythms and oscillatory processes; and neuronal and glial differentiation. Emphasis is on fundamental mechanisms underlying these processes in normal development, and in responses to disease, injury, and extrinsic factors, including circadian events and prenatal exposure to drugs.

**Specific areas covered by NCF:**

- Regulation of the cell cycle; mechanisms of growth arrest and re-initiation of cell division and differentiation; initiation and regulation of circadian and oscillatory processes

- Fundamental cellular and molecular mechanisms of neural induction in normal development, including transcriptional regulation and signaling pathways; the cellular and molecular mechanisms through which the embryonic neural ectoderm acquires the characteristics of adult brain regions, including regionalization of gene transcription, cell-cell interactions, migration, circadian rhythmicity, and secreted signals that influence these events; effects of extrinsic factors, such as teratogens and drugs on these processes

- Neuronal and glial progenitors; cellular and molecular mechanisms of stem cell and progenitor cell induction, proliferation, migration, and phenotypic restriction; the influence of aging, extrinsic factors, disease and injury on these processes; characterization of stem cells for the purpose of repair following developmental and degenerative disease and injury

- Cell fate specification; effects of cell lineage, cell-intrinsic components [such as transcription factors], cell-cell interactions [before, during and after migration], secreted factors [such as growth factors, cytokines, hormones, and neurotransmitters], and drugs on the phenotypic determination of neurons and non-neuronal cells, particularly glia

- Neuronal and glial cell differentiation and specialization; transcriptional and post-transcriptional regulation of the acquisition of the differentiated cellular and molecular characteristics of neurons and glia, including cell morphology, excitability, growth factor responsiveness and expression of specific neurotransmitters and their receptors; cell-cell interactions, among neurons and non-neuronal cells, such as glia and other cells participating in the development of the nervous system, leading to cell specializations such as myelin, and the development of specialized structures like the blood-brain barrier

- Circadian rhythm and other oscillatory processes; cell and molecular genetics producing rhythmicity, genomic mechanisms, pathways, transcripts, intracellular pathways, cell cultures, mutagenesis, regulation of clock-controlled genes, and the modulation of oscillatory functions

**NCF has the following shared interests within the MDCN IRG:**

- **With Synapses, Cytoskeleton and Trafficking [SYN]:** SYN and NCF share an interest in the area of neuroplasticity. Applications dealing with fundamental mechanisms of neuroplasticity or with cytoskeletal functions and cell surface molecules may be more appropriate for SYN, while studies of plasticity associated with the establishment, maintenance, and reorganization of synaptic connections may be more appropriate for NCF.

- **With Neural Degenerative Disorders and Glial Biology [NDGB]:** NDGB and NCF share an interest in (1) studies of cell death. Studies of mechanisms of neuronal cell death per se may be appropriate for NDGB, but studies that focus on cell death in lineage restriction or patterning in the developing nervous system may be appropriate for NCF. (2) NDGB and NCF also share an interest in the study of signaling molecules [e.g., growth factors]. Studies in which the principal focus is the role of these molecules in neural induction, specification, or differentiation may be appropriate for NCF whereas studies of the neuroprotective effects of such factors or studies involving factors related to glial differentiation may be appropriate for NDGB.

- **With Neural Degenerative Disorders and Glial Biology [NDGB] and Neural Oxidative Metabolism and Death [NOMD]:** NCF, NDGB and NOMD all review studies of cell death. Studies that focus on the involvement of cell death in lineage restriction or patterning in the developing nervous system may be appropriate for NCF. Studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development may be appropriate for NDGB when the principal focus is on the role of these molecules in neuroprotection. Studies of mechanisms of cell death per se may be appropriate for review in NOMD.

- **With Neurodifferentiation, Plasticity, and Regeneration [NDPR]:** NDPR and NCF share an interest in (1) studies of axonal projection patterns. Studies of mechanisms of axonal growth or establishment of connectivity per se may be appropriate for NDPR, while studies in which axonal projection patterns are used as markers of cell identity or of nervous system regionalization may be appropriate for NCF. (2) NDPR and NCF also share an interest in studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development. These studies are appropriate for NDPR when the principal focus is the role of these molecules in migratory events or in the establishment or modification of connectivity, whereas if the primary focus is on the role of these molecules in neural induction or specification, the studies may be appropriate for NCF. (3) NDPR and NCF share an interest in neurogenetics. Genetic screens [e.g., in invertebrate] that initially involve screening of non-developmental characteristics [such as the organization, function or behavior of mature nervous systems], may be appropriate for NDPR if the principal aim is to relate mutations to fundamental processes that regulate migratory events or the establishment or modification of connectivity. Those studies in which the aim is to relate mutations to fundamental processes that regulate neural induction or specification may be appropriate for NCF.

**NCF has the following shared interests outside the MDCN IRG:**

- **With the Cell Biology [CB] IRG:** The CB IRG and NCF share an interest in circadian rhythms. (1) Studies that focus on cellular and molecular mechanisms involved in circadian rhythms and general phototransduction mechanisms may be appropriate for the CB IRG; whereas studies that focus on the neural cellular and molecular mechanisms involved may be appropriate for NCF. (2) The CB IRG and NCF share an interest in cell death as it relates to lineage restriction or patterning. Applications that deal with the death of cells in a general context may be appropriate for the CB IRG. Applications that deal with the death of cells in the context of the developing nervous system may be appropriate for NCF. (3) The CB IRG and NCF share an interest in cell cycle regulation and transcription. Applications that focus on cell cycle regulation and transcription in general may be appropriate for the CB IRG; whereas applications that focus on the nervous system may

be appropriate for NCF. (4) The CB IRG and NCF share an interest in the visual system. Applications that require specialized knowledge or appreciation of the posterior portion of the eye or the retina may be reviewed in the CB IRG. Applications focusing on fundamental aspects of nervous system development may be reviewed in NCF.

- **With the Genes, Genomes and Genetics [GGG] IRG:** 1) The GGG IRG and NCF share interests in neurogenetics. Applications having a primary focus on genetics or emerging genetic techniques may be reviewed by GGG. However, applications having a primary focus on fundamental issues of neurodevelopment may be reviewed by NCF. (2) GGG and NCF also share an interest in cell cycle regulation and transcription. Applications that focus on cell cycle regulation and transcription may be appropriate for the GGG IRG. Applications that focus on cell cycle regulation and transcription in the nervous system may be appropriate for NCF.

- **With the Biology of Development and Aging [BDA] IRG:** (1) The BDA IRG and NCF share an interest in the regulation of gene expression, patterning, cell fate specification and stem cells. Studies focused on general mechanisms applicable to all organ systems, whether CNS- or PNS-related, may be appropriate for the BDA IRG. Studies focused on the nervous system in these areas, whether CNS- or PNS-related, may be appropriate for NCF. (2) The BDA IRG and NCF share an interest in the general area of cellular development. If processes of general or non-neuronal cellular development are the focus, the BDA IRG may be appropriate. However, if processes of neuronal cellular development are the focus, NCF may be appropriate. (3) The BDA IRG and NCF also share an interest in embryogenesis and morphogenesis. Applications with a focus on general aspects of embryogenesis or morphogenesis may be appropriate for the BDA IRG, whereas applications with a specific focus on nervous system development may be appropriate for NCF. (4) The BDA IRG and NCF share an interest in cell death as it relates to lineage restriction or patterning. Applications that deal with the death of cells in a general context may be appropriate for BDA. Applications that deal with the death of cells in the context of the developing nervous system may be appropriate for NCF.

- **With the Biobehavioral and Behavioral Processes [BBBP]; Risk, Prevention and Health Behavior [RPHB]; and Health of the Population [HOP] IRGs:** The BBBP, RPHB, and HOP IRGs and NCF share interests in neural development. Applications emphasizing the behavioral or social science aspects of neural development may be reviewed in BBBP, RPHB, or HOP. Applications emphasizing the cellular, molecular or biochemical aspects of neural development may be reviewed in NCF.

- **With the Respiratory Sciences [RES] IRG:** The RES IRG and NCF have shared interests in the areas of rhythm generation. Studies of respiratory rhythm generation, including developmental studies in this area, may be appropriate for RES, while studies focused on basic neural mechanisms of central pattern generators versus respiratory rhythm generation per se, may be appropriate for NCF.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) The IFCN IRG and NCF share interests in development and the effects of exposure to exogenous agents or stress. Those studies that focus on analysis of the organization, function or behavior of mature nervous systems may be appropriate for the IFCN IRG. Those studies that focus on fundamental processes involved in neural induction, specification, or differentiation may be appropriate for the NCF. (2) The IFCN IRG and NCF share an interest in circadian rhythms and oscillatory processes. If studies involve a largely systems approach, they may be appropriate for the IFCN IRG. If studies involve molecular and cellular mechanisms, they may be appropriate for NCF. (3) The IFCN IRG and NCF share an interest in the functionality of the developing chemosensory, visual, auditory, and vestibular systems. Where specific knowledge of the systems is essential, the IFCN IRG may be appropriate; where specific knowledge of basic development or model systems is essential, NCF may be appropriate.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** (1) The BDCN IRG and NCF share an interest in developmental defects. Studies of developmental effects of prenatal exposure to drugs may be appropriate for the BDCN IRG, particularly if the focus is on clinical aspects. Studies of neural induction, specification, or differentiation may be appropriate for NCF. (2) The BDCN IRG and NCF share an interest in studies involving stem cells. Studies in which the primary goal is a restorative/therapeutic outcome may be appropriate for the BDCN IRG. Studies in which the primary goal is an understanding of neural induction, specification, or differentiation may be appropriate for NCF. (3) The BDCN IRG and NCF also share an interest in the visual system. Applications that require specialized knowledge or appreciation of the anterior portion of the eye may be reviewed in the BDCN IRG. Applications focusing on fundamental aspects of nervous system development may be reviewed in NCF.

TOP

## Neurodifferentiation, Plasticity, and Regeneration Study Section [NDPR]

***Formerly MDCN-7***

[NDPR Roster]

The Neurodifferentiation, Plasticity, and Regeneration [NDPR] Study Section reviews applications focused on differentiation, plasticity, aging and regeneration of neuronal connectivity. This area includes process outgrowth, axon guidance, selection of synaptic targets, dendrite differentiation, establishment of neural maps, and formation and elimination of synaptic connections. Emphasis is on fundamental mechanisms underlying these processes in normal development and aging, and in response to disease, injury, and extrinsic factors, including prenatal exposure to drugs. The study section also reviews studies of the reestablishment of connectivity in aging, disease, and following injury, but with a focus on the analysis of cellular and molecular mechanisms that stimulate, inhibit, or otherwise perturb process growth and synapse formation.

**Specific areas covered by NDPR:**

- Substrates for neuronal and glial cell migration, including scaffolds; permissive and directional cues, and mechanisms through which they control cell motility, outgrowth and directional migration

- Cellular and molecular mechanisms, including signal transduction pathways that regulate axonal and dendritic outgrowth, fasciculation, branching and guidance; mechanisms regulating the selection of synaptic partners, including formation of topographic and laminar-specific projections

- Synapse formation and developmental plasticity. Initial formation and maturation of pre- and postsynaptic elements; mechanisms regulating the elaboration of arbors and retraction of processes, including the role of growth factors, cell-cell recognition molecules, electrical activity, and experience

- Regeneration of connections; positive factors [e.g., simulators of growth, directional cues, cell grafts (including stem cell grafts) and prosthetics] that can promote or direct axon sprouting, axon regrowth, and reestablishment of appropriate connections following injury; factors that inhibit these processes, and development of tools to overcome their effects

**NDPR has the following shared interests within the MDCN IRG:**

- **With Synapses, Cytoskeleton and Trafficking [SYN]:** (1) SYN and NDPR share interests in the area of neuroplasticity. Studies focused on fundamental mechanisms of trafficking, basic cytoskeletal interactions, and synaptic function, including vesicular release, endocytosis, and receptor turnover may be appropriate for SYN. Studies focused on developmental and regenerative events, including process outgrowth and guidance, dendritic development, and synaptogenesis, may be appropriate for NDPR. (2) SYN and NDPR share interests in the study of cytoskeletal, cell membrane and extracellular matrix components. Those studies that focus on issues of trafficking or basic synaptic function may be appropriate for SYN, while studies that focus on developmental events or repair mechanisms may be appropriate for NDPR.

- **With Neural Degenerative Disorders and Glial Biology [NDGB]:** NDGB and NDPR share an interest in the areas of glial-neuronal interactions and repair following injury. Studies focused on mechanisms of neurodegeneration, neuronal survival, glial responses to injury, or myelination may be appropriate for NDGB. Studies focused on the role of glia in axon outgrowth, nerve regeneration, and synapse formation and studies examining spinal cord regeneration, peripheral nerve regeneration, and the restoration of synaptic function may be appropriate for NDPR.

- **With Neurogenesis and Cell Fate [NCF]:** NCF and NDPR share an interest in (1) studies of axonal projection patterns. Studies in which axonal projection patterns are used as markers of cell identity or of nervous system regionalization may be appropriate for NCF, while studies of mechanisms of axonal growth or establishment of connectivity per se may be appropriate for NDPR. (2) NCF and NDPR also share an interest in studies of signaling molecules [e.g., growth factors] that affect multiple aspects of development. These studies are appropriate for NCF if the primary focus is on the role of these molecules in neural induction or specification, while NDPR may be appropriate when the principal focus is the role of these molecules in migratory events or in the establishment or modification of connectivity. (3) NCF and NDPR share an interest in neurogenetics. Those studies in which the aim is to relate mutations to fundamental processes that regulate neural induction or specification may be appropriate for NCF. Genetic screens [e.g., in invertebrate] that initially involve screening of non-developmental characteristics [such as the organization, function or behavior of mature nervous systems], may be appropriate for NDPR if the principal aim is to relate mutations to fundamental processes that regulate migratory events or the establishment or modification of connectivity.

**NDPR has the following shared interests outside the MDCN IRG:**

- **With the Cell Biology [CB] IRG:** The CB IRG and NDPR share interests in cellular development. CB IRG may be appropriate if the main focus is cellular biology and physiology. NDPR may be appropriate if the system under study is CNS- or PNS-based. (2) The CB IRG and NDPR also share interests in the area of vision research. Applications that require specialized knowledge or appreciation of the posterior portion of the eye or the retina may be appropriate for the CB IRG. Applications focused on basic neurological aspects of nervous system development may be appropriate for NDPR.

- **With the Genes, Genomes and Genetics [GGG] IRG:** The GGG IRG and NDPR share interests in neurogenetics. Applications focused on emerging genetic techniques or on genetics using the nervous system as a model may be appropriate for the GGG IRG. Applications focused on the molecular bases of neurogenetic development may be appropriate for NDPR.

- **With the Biology of Development and Aging [BDA] IRG:** (1) The BDA IRG and NDPR share interests in embryogenesis and morphogenesis. Applications that emphasize general aspects of embryogenesis or morphogenesis may be appropriate for the BDA IRG. Applications with a specific focus on nervous system development may be appropriate for NDPR. (2) The BDA IRG and NDPR also share an interest in cell polarity, differentiation and regeneration. Studies focused on general mechanisms in these areas may be appropriate for the BDA IRG. Studies focused on the nervous system in these areas may be appropriate for NDPR.

- **With the Biobehavioral and Behavioral Processes [BBBP]; Risk, Prevention and Health Behavior [RPHB]; and Health of the Population [HOP] IRGs:** The behavioral and social science IRGs [BBBP, RPHB, and HOP] and NDPR share interests in neural development, aging, and injury. Applications that focus on behavioral or social aspects of neural development, aging and injury may be assigned to BBBP, RPHB, or HOP. Applications that focus on cellular or molecular aspects of neural development, aging and injury may be

assigned to NDPR.

- **With the Musculoskeletal, Oral and Skin Sciences [MOSS] IRG:** The MOSS IRG and NDPR share an interest in skeletal muscle. MOSS may be appropriate for studies of clinical aspects of skeletal muscle, skeletal muscle development and/or skeletal muscle force production, but NDPR may be appropriate when the primary focus in on neural structure and function, or the neuronal control of muscle force production or development.

- **With the Respiratory Sciences [RES] IRG:** The RES IRG and NDPR have shared interests in the areas of (1) neurotransmitters, (2) neural plasticity and (3) development. Studies of neurotransmitters, when in the context of understanding the central control of breathing, may be appropriate for RES, while studies focused on the broader understanding of neurotransmitter function may be appropriate for NDPR. Studies of respiratory neural plasticity, when in the context of response to hypoxia, may be appropriate for RES, while studies on broader aspects of neural plasticity may be appropriate for NDPR. Studies of respiratory rhythm generation, including developmental studies in this area, may be appropriate for RES, while studies focused on basic neural mechanisms of central pattern generators versus respiratory rhythm generation per se, may be appropriate for NCF.

- **With the Integrative, Functional and Cognitive Neuroscience [IFCN] IRG:** (1) The IFCN IRG and NDPR share an interest in development. Such studies that focus on motivation and emotion may be appropriate for the IFCN IRG. Such studies that focus on general neural development may be appropriate for NDPR. (2) The IFCN IRG and NDPR also share interests in the regulation of brain activity and behavior. Those studies focusing on neuroendocrine and neuroimmune systems may be appropriate for the IFCN IRG. Those studies focusing on development may be appropriate for NDPR. (3) The IFCN IRG and NDPR also share interests in sleep, biorhythms, and the autonomic nervous system. If the focus is regulatory and integrative activity, the IFCN IRG may be appropriate. If the focus is development, NDPR may be appropriate. (4) The IFCN IRG and NDPR also share interests in sensory systems. The IFCN IRG may review applications where a sensory system is used to study the specifics of sensation. NDPR may be appropriate for applications where a sensory system is used as a model to study principles of nervous system development. (5) The IFCN IRG and NDPR also share interests in motor systems. The IFCN IRG may review applications if the focus is specifically the motor system. NDPR may review applications if the focus is principles of nervous system development. (6) The IFCN IRG and NDPR also share interests in synaptic plasticity. Studies of plasticity associated with cognitive processes such as learning and memory may be appropriate for the IFCN IRG. Studies of plasticity associated with the establishment, maintenance, and reorganization of synaptic connections may be appropriate for NDPR.

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** The BDCN IRG and NDPR have shared interests in the area of spinal cord and nerve regeneration. The BDCN IRG may be appropriate for studies focused on clinical aspects of regeneration. NDPR may be appropriate for studies focused on basic aspects of regeneration.

TOP

## Molecular, Cellular and Developmental Neuroscience Small Business Activities [SBIR/STTR] Special Emphasis Panel [MDCN Small Business SEP]

[MDCN (10) Roster] xml:namespace prefix = "o" ns = "urn:schemas-microsoft-com:office:office" />

The MDCN Small Business SEP [MDCN (10)], *previously ZRG1 MDCN-3 (10) B*, reviews SBIR/STTR applications within the areas covered by the MDCN IRG. The main focus is on the molecular and cellular level. In general, the projects involve development of devices, reagents, and software to probe channels, signal transduction, and the transducers themselves. Studies may involve basic biological processes that underlie or may be altered by disease processes. Examples of devices might include development of imaging and recording techniques; analytical and system controlling software; monitoring and assay platforms; neuroprosthetic devices; biosensors; and stem cells and cell culture systems. Projects might also focus on neurodrug discovery and development; molecular manipulation and engineering; development of specific research reagents and assays; therapeutics; and proteins that interact with and modulate neuroreceptors, transporters and transducers.

**The MDCN Small Business SEP has the following shared interests outside the MDCN IRG:**

- **With the Brain Disorders and Clinical Neuroscience [BDCN] IRG:** The BDCN IRG and MDCN (10) share interests in neuropathology. The BDCN IRG may review small business applications focused on a neural disease or disease process. MDCN (10) may review small business applications focused on a basic neural cellular or molecular mechanism.

TOP

# Biochemical and Molecular Neuroscience Fellowship Study Section [F03A]

**Biochemical and Molecular Neuroscience**

**[Molecular, Cellular and Developmental Neuroscience (MDCN) Integrated Review Group]**

**[ F03A Roster ]**

The F03A study section reviews fellowship applications on the basic cellular and molecular biology of neuronal, glial, retinal and other excitable cells (including chromaffin cells, neuroendocrine cells and muscle cells); the fundamental mechanisms of neuronal cell function, including those relevant to disease processes; the general mechanisms underlying cell death; the mechanisms underlying the initial formation of, as well as cell specialization and differentiation in the developing nervous system; the mechanisms underlying oscillatory events; and the mechanisms that specify or influence migratory events and the development, aging, and regeneration of neuronal connectivity. Examples of specific areas covered, as they relate to neuronal and glial cells, are listed below.

- Synaptic plasticity
- Trafficking
- Cytoskeleton
- Progenitor and stem cells
- Development
- Differentiation
- Axon outgrowth
- Regeneration
- Glial biology/inflammation
- Myelination
- Circadian mechanisms
- Degeneration/apoptosis

**Shared Interests:**

**With F01 (Brain Disorders and Related Neuroscience) in the areas of neurodegenerative diseases and inflammation:** If applications emphasize biochemical and molecular or cellular approaches, then assignment to the F03 fellowship study sections may be appropriate. If applications emphasize disease processes, then assignment to the F01 fellowship study section may be appropriate.

**With F02A (Behavioral Neuroscience), in the areas of neuroimmunology and circadian rhythms:** Applications emphasizing systems approaches may be assigned to F02A; applications emphasizing biochemical and molecular or cellular approaches may be assigned to F03A.

**With F03B (Biophysical and Physiological Neuroscience), in the areas of synaptic function and synaptic plasticity:** Applications that emphasize biochemical and molecular or cellular approaches may be assigned to F03A; applications that emphasize physiological, pharmacological and biophysical approaches may be assigned to F03B.

**With F04B (Biophysical and Biochemical Sciences) regarding studies of membrane recycling, protein structure-function and cytoskeleton structure:** Applications concerned with neuronal function and structure may be assigned to F03A; applications concerned with quantitative analysis of biomolecular interactions and defining specific folding conformations may be assigned to F04B.

**With F05 (Cell Biology and Development) in the areas of development, differentiation, progenitor and stem cells, and cytoskeleton:** Applications focusing on these functions in neuronal, glial, retinal, and other excitable cells may be assigned to F03A; applications focusing on basic cell structure, function, and regulation may be assigned to F05 if using neural cells as model systems. Also, F05 may review fellowship applications on the cell biology of the retina.

TOP

# Biophysical and Physiological Neuroscience Fellowship Study Section [F03B]

**Biophysical and Physiological Neuroscience**

**[Molecular, Cellular and Developmental Neuroscience (MDCN) Integrated Review Group]**

**[ F03B Roster ]**

Areas of interest encompassed by this study section include the basic cellular and molecular physiology of neurons, glial, retinal, and other excitable cells (including chromaffin cells, neuroendocrine cells and muscle cells); the structural and functional characteristics of ion channels and transporters; the mechanisms by which extra- and intracellular signals are transduced; the structure and function of the transducers themselves; cellular regulation/physiology; neurochemical and pharmacological mechanisms; and the development of therapeutic compounds. Examples of specific areas covered, as they relate to neuronal and glial cells, are listed below.

- Signal transduction
- Ion channels
- Transporters
- Neuropharmacology
- Neuroendocrinology
- Neuromodulators
- Oxidative metabolism
- Gap junctions and connexins
- Neurotransmitter synthesis
- Electrophysiology
- Imaging
- Medicinal Chemistry

**Shared Interests:**

**With F03A (Biochemical and Molecular Neuroscience) in the areas of synaptic function and synaptic plasticity:** Applications that emphasize biochemical and molecular or cellular approaches may be assigned to F03A; applications that emphasize physiological, pharmacological and biophysical approaches may be assigned to F03B.

**With F02B (Sensory, Motor, and Cognitive Neuroscience), in the area of vision:** Studies of integrated circuits, systems, and behavior may be appropriate for F02B; studies of signal transduction and related processes that occur at the single cell level with emphasis on cell electrophysiology, molecular biophysics, and neurochemical pathways may be appropriate for F03B.

**With F04B (Chemical and Bioanalytical Sciences) regarding studies of membrane recycling, protein structure-function and cytoskeleton structure:** Applications concerned with neuronal function and structure may be assigned to F03B; applications concerned with quantitative analysis of biomolecular interactions and defining specific folding conformations may be assigned to F04B. Also, studies of signal transduction and related processes that occur at the single cell level with emphasis on cell electrophysiology, molecular biophysics, and neurochemical pathways may be appropriate for F03B; studies of signal transduction and related processes that occur at the molecular level with emphasis on basic biochemistry or biophysics may be appropriate for F04B.

**With F06 (Endocrinology, Nutritional Metabolism, and Reproductive Sciences) , in the area of endocrinology:** Applications that involve neural or glial cells may be appropriate for F03A; applications that involve endocrine or reproductive cells may be appropriate for F06.

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*Last updated: February 16, 2006*